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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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LOWRIE, LANDO & ANASTASI
RIVERFRONT OFFICE
ONE MAIN STREET, ELEVENTH FLOOR
CAMBRIDGE, MA 02142

EXAMINER	
HO, ALLEN C	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 04/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/522,495	INNEMAN ET AL.	
	Examiner	Art Unit	
	Allen C. Ho	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *23-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 January 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *26012005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **102a, 102b, 102c, 102d, 102e, 102f.** Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities:

Page 5, last paragraph, line 10, "the bottom most" should be replaced by --the third--.

Appropriate correction is required.

Claim Objections

3. Claims 38-44 are objected to because of the following informalities:

(1) Claim 38, line 7, "the or each" should be replaced by --each of the one or more--.

(2) Claim 39, line 1, "the or each" should be replaced by --each of the one or more--.

(3) Claim 42, line 1, --the one or more-- should be inserted before "high energy".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 24, 25, 28, 29, and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 24, 25, 28, and 29 recite conditions that depend on an external x-ray source and relative positioning between the x-ray source and the Soller slit. These recitations are indefinite because they do not clearly define the structure of the Soller slit.

Claim 42 recites "the high energy radiation collimating device comprises a Soller slit device." It is unclear what structure is set forth by this recitation.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 23, 25, 26, 28, and 32-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Tosswill *et al.* (U. S. Patent No. 4,125,776).

With regard to claims 23 and 26, Tosswill *et al.* disclosed a Soller slit for collimating high energy radiation comprising: a plurality of blades (**10**) having a length, thickness, and at least one surface, the plurality of blades being formed from at least a first material having a density less than 6 g/cm3, the plurality of blades positioned to transmit radiation substantially parallel to the plurality of blades and to absorb divergent radiation, wherein the first material comprises glass.

With regard to claims 25 and 28, Tosswill *et al.* disclosed the Soller slit of claim 23, wherein the transmission efficiency is at least 80% (when the incident radiation is highly collimated).

With regard to claims 32 and 33, Tosswill *et al.* disclosed the Soller slit of claim 23, wherein the thickness of each blade is less than 50 μm (t_s = 25 μm, column 4, lines 40-43).

With regard to claims 34 and 35, Tosswill *et al.* disclosed the Soller slit of claim 23, wherein the surface (**14**) of each of the blades is non-reflective to x-rays.

With regard to claim 36, Tosswill *et al.* disclosed the Soller slit of claim 34, wherein the blades each have a non-reflective coating (**14**).

With regard to claim 37, Tosswill *et al.* disclosed the Soller slit of claim 34, wherein the surface of each of the blades is etched to prevent reflection (column 6, lines 25-35).

8. Claims 38 and 40-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Wei *et al.* (U. S. Patent No. 5,231,655).

With regard to claims 38 and 43, Wei *et al.* disclosed a system comprising: a high energy radiation source (**20**); one or more high energy radiation collimating devices; and one or more devices (**40**) for collecting high energy radiation after the high energy radiation impinges on a sample to be examined; wherein each of the one or more high energy collimating devices comprises a plurality of collimating members (**310**) formed from at least a first material having a density less than 6 g/cm^3, and wherein the first material comprises glass (column 5, lines 45-51).

With regard to claim 40, Wei *et al.* disclosed the diffractometry system of claim 38, wherein the high energy radiation comprises x-ray radiation.

With regard to claim 41, Wei *et al.* disclosed the diffractometry system of claim 38, wherein the high energy radiation comprises EUV radiation (*Bremsstrahlung* radiation is a white broadband radiation).

With regard to claim 42, Wei *et al.* disclosed the diffractometry system of claim 38. Claim 42 recites "Soller slit devices", which is a nominal recitation without any structure. Accordingly, claim 42 is rejected with claim 38.

9. Claims 23, 25, 27, 28, 38, 40-42, and 44 are rejected under 35 U.S.C. 102(b) as being anticipated by Otto *et al.* (J. Appl. Cryst. **29** (1996), 495-497).

With regard to claims 23 and 27, Otto *et al.* disclosed a Soller slit for collimating high energy radiation comprising: a plurality of blades having a length, thickness, and at least one surface, the plurality of blades being formed from at least a first material having a density less than 6 g/cm3, the plurality of blades positioned to transmit radiation substantially parallel to the plurality of blades and to absorb divergent radiation, wherein the first material comprises glass (page 496, column 2, lines 17-26).

With regard to claims 25 and 28, Otto *et al.* disclosed the Soller slit of claim 23, wherein the transmission efficiency is at least 80% (when the incident radiation is highly collimated).

With regard to claims 38 and 44, Otto *et al.* disclosed a system for performing high energy radiation diffractometry, comprising: a high energy radiation source (x-ray generator); one or more high energy radiation collimating devices (Soller slit); and one or more devices (a detection device having a cylindrically-bent imaging plate and scintillation detectors) for collecting high energy radiation after the high energy radiation impinges on a sample to be examined; wherein each of the one or more high energy collimating devices comprises a plurality of collimating members (plates) formed from at least a first material having a density less than 6 g/cm^3, and wherein the first material comprises mica (page 496, column 2, lines 17-26).

With regard to claim 40, Otto *et al.* disclosed the diffractometry system of claim 38, wherein the high energy radiation comprises x-ray radiation.

With regard to claim 41, Otto *et al.* disclosed the diffractometry system of claim 38, wherein the high energy radiation comprises EUV radiation (*Bremsstrahlung* radiation is a white broadband radiation).

With regard to claim 42, Otto *et al.* disclosed the diffractometry system of claim 38, wherein the high energy radiation collimating device comprises one or more Soller slit devices.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 24 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tosswill *et al.* (U. S. Patent No. 4,125,776) as applied to claim 23 above, and further in view of Cullity and Stock.

With regard to claims 24 and 29-31, Tosswill *et al.* disclosed the Soller slit of claim 23. However, Tosswill *et al.* failed to teach that the Soller slit has a divergence of less than 0.1°, and the length of each blade is at least 15 cm.

Cullity and Stock disclosed that the maximum divergence angle (β_2) is inversely proportional to the length (u) of the collimator (equation 8-5, p. 271).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide blades having a length of at least 15 cm, since a person would be motivated to reduce the divergence of x-rays.

12. Claims 24 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otto *et al.* (J. Appl. Cryst. **29** (1996), 495-497) as applied to claim 23 above, and further in view of Shimizu *et al.* (U. S. Patent No. 6,307,917 B1).

With regard to claims 24 and 29-31, Otto *et al.* disclosed the Soller slit of claim 23. However, Otto *et al.* failed to teach that the Soller slit has a divergence of less than 0.1°, and the length of each blade is at least 15 cm.

Shimizu *et al.* disclosed that the divergence angle (θ_2) depends on the length (L_3) of the blades (**27**) (column 5, lines 63 - column 6, line 4).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide blades having a length of at least 15 cm, since a person would be motivated to reduce the divergence of x-rays.

With regard to claims 32 and 33, Otto *et al.* disclosed the Soller slit of claim 23. However, Otto *et al.* failed to disclose the thickness of each blade.

Shimizu *et al.* disclosed a Soller slit comprising a plurality of blades (**27**), each blade having a thickness of about 50 μm (column 6, lines 2-4).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide blades having a thickness less than 50 μm, since a person would be motivated to increase the x-ray flux by reducing the absorption cross-section of the Soller slit.

13. Claim 34-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otto *et al.* (J. Appl. Cryst. **29** (1996), 495-497) as applied to claim 23 above, and further in view of Fujinawa *et al.* (U. S. Patent No. 6,266,392 B1).

With regard to claims 34-37, Otto *et al.* disclosed the Soller slit of claim 23. However, Otto *et al.* failed to teach that each of the blades has a non-reflective coating.

Fujinawa *et al.* disclosed a Soller slit device having non-reflective blades (column 1, line 45 - column 3, line 32). Funinawa *et al.* taught by providing non-reflective blades, it is possible to form high precision parallel x-ray beams, thereby the resolution in the x-ray measurement is improved (column 2, lines 47-51).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide blades having a non-reflective coating, since a person would be motivated to improve the resolution of measurements.

14. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wei *et al.* (U. S. Patent No. 5,231,655) as applied to claim 38 above.

With regard to claim 39, Wei *et al.* disclosed the diffractometry system of claim 38. However, Wei *et al.* failed to disclose that each of the one or more high energy collimating device has a divergence of less than 0.1° and a transmission efficiency of at least 60%.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to configure the one or more collimating devices such that the above conditions are realized, since a person would be motivated to increase transmission efficiency, while minimizing the divergence angle.

15. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Otto *et al.* (J. Appl. Cryst. **29** (1996), 495-497) as applied to claim 38 above.

With regard to claim 39, Otto *et al.* disclosed the diffractometry system of claim 38. However, Otto *et al.* failed to disclose that each of the one or more high energy collimating device has a divergence of less than 0.1° and a transmission efficiency of at least 60%.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to configure the one or more collimating devices such that the above conditions are realized, since a person would be motivated to increase transmission efficiency, while minimizing the divergence angle.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(1) Bowen *et al.* (U. S. Patent No. 6,881,965 B2) disclosed a multi-foil optic.

(2) Bowen *et al.* (U. S. Pub. No. 2004/0131147 A1) disclosed a Soller slit using low-density materials.

(3) Souchay *et al.* (U. S. Pub. No. 2003/0081731 A1) disclosed an antiscatter grid.

(4) Logan *et al.* (U. S. Patent No. 5,455,849) disclosed an air-core grid.

(5) Kariya *et al.* (U. S. Patent No. 5,164,974) disclosed two glass Soller slits (**114a**, **114b**).

(6) Zehnpfennig *et al.* (U. S. Patent No. 4,429,953) disclosed a plurality of glass reflectors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Allen C Ho

Allen C. Ho, Ph.D.
Primary Examiner
Art Unit 2882

21 April 2006